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Amendments to the Specification

[0008] The invention includes a ≥ 4 kHz repetition rate argon fluoride excimer laser system for producing an UV wavelength 193nm output. The ≥ 4 kHz repetition rate argon fluoride excimer laser system includes an argon fluoride excimer laser chamber for producing a 193nm discharge at a pulse repetition rate ≥ 4 kHz. . The ≥ 4 kHz repetition rate argon fluoride excimer laser chamber includes at least one magnesium fluoride crystal optic window for outputting the 193nm discharge as a ≥ 4 kHz repetition rate excimer laser 193nm output with the magnesium fluoride crystal optic window having a 255nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence ≥ 40mj/cm^2/pulse and a 42mm crystal 120nm transmission of at least 30%. <u>That is, the invention includes a ≥ 4 kHz repetition rate argon fluoride excimer laser system in which the laser chamber has at least one window made from a single crystal of magnesium fluoride, and such window, after exposure to 5 million pulses of 193nm light having a fluence of 40mJ/cm^2/pulse, has an absorbance of less than 0.08 Abs per 42mm path length when measured at 255nm and a 120nm transmission of at least 30% through a 42mm path.</u>

[0014] The invention includes a λ<200nm optical fluoride crystal for transmitting a UV wavelength λ<200nm with the λ<200nm optical fluoride crystal comprised of a magnesium fluoride crystal with a 255nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence ≥40mj/cm^2/pulse and a 42mm crystal 120nm transmission of at least 30%, and a Fe contamination level less than 0.17 ppm Fe by weight, a chrome contamination level less than 00.08 ppm chrome by weight, a copper contamination level less than 0.04 ppm copper by weight, a cobalt contamination level less than 0.04 ppm cobalt by weight, an Al contamination level less than 0.9 ppm Al by weight, a nickel contamination level less than 0.04 ppm nickel by weight, a vanadium contamination level less than 0.04 ppm vanadium by weight, and a lead contamination level less than 0.04 ppm lead by weight and a 200 to 210 nm range absorption coefficient < 0.0017 cm^{-1}. Preferably the Fe contamination level is less than 0.15 ppm Fe by weight, the chrome contamination level is less than 0.06 ppm chrome by weight, the copper contamination level is less than 0.02 ppm copper by weight, the cobalt contamination level is less than 0.02 ppm cobalt by weight, the Al contamination level is less than 0.7 ppm Al by weight, the nickel

contamination level is less than 0.02 ppm nickel by weight, the vanadium contamination level is less than 0.02 ppm vanadium by weight, and the lead contamination level is less than 0.02 ppm lead by weight. That is, the invention includes an optical fluoride crystal comprised of a magnesium fluoride crystal that when exposed to 5 million pulses of 193 nm light at a fluence ≥ 40mj/cm^2/pulse has an induced absorption of less than 0.08 Abs per 42mm path and a 120nm transmission of at least 30% through a 42mm crystal; and contaminants at levels as specified above in this paragraph.

[0027] In an embodiment of the invention, the ≥ 4 kHz repetition rate argon fluoride laser system includes a magnesium fluoride crystal optic prism. The magnesium fluoride crystal optic prism is external from the excimer laser chamber with the ≥ 4 kHz repetition rate excimer laser 193 nm output transmitted through the prism. The magnesium fluoride crystal optic prism has a 255 nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses of 193 nm light at a fluence ≥40mj/cm^2 and a 42 mm crystal 120 nm transmission of at least 30%. That is, the invention includes a magnesium fluoride optical fluoride prism that when exposed to 5 million pulses of 193nm light at a fluence ≥ 40mj/cm^2/pulse has an induced absorption of less than 0.08 Abs per 42mm path and a 120nm transmission of at least 30% through a 42mm crystal path length; and contaminants at levels as specified above in this paragraph. Preferably the 42 mm crystal path length 120 nm transmission is at least 35%, more preferably at least 40%, and most preferably at least 45%. FIG. 1 shows an embodiment with three magnesium fluoride crystal optic prisms 30 which transmit and control the 193 nm photons outputted from laser chamber 22 through magnesium fluoride crystal optic window 20. Magnesium fluoride crystal optic prisms 30 are ≥ 4kHz repetition rate excimer laser magnesium fluoride crystal line narrowing module beam expanding prisms which have a 255 nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses at 193 nm light at a fluence ≥ 40 mj/cm^2 and a 42 mm crystal path length 120 nm transmission of at least 30%. Preferably, magnesium fluoride crystal optic prisms 30 have a 200 to 210 nm range absorption coefficient < 0.0017 cm^{-1}, more preferably a 203 to 207 nm range absorption coefficient < 0.0017 cm^{-1}, and most preferably a 205 nm absorption coefficient < 0.0017cm^{-1}. Preferably the ≥ 4 kHz repetition rate excimer laser 193 nm output is transmitted through prisms 30 substantially parallel to a ~~c-axis~~ c-axis of the magnesium fluoride crystal optic prism with the 193 nm light rays substantially parallel

with the magnesium fluoride crystal c axis. Preferably magnesium fluoride crystal optic prism 30 has a ~~e-axis~~ c-axis grown magnesium fluoride crystallographic orientation with the magnesium fluoride crystal grown on a ~~e-axis~~ c-axis oriented seed crystal. Preferably magnesium fluoride crystal optic prism 30 has contamination levels of a Fe contamination level less than 0.15 ppm Fe by weight, a chrome contamination level less than 0.06 ppm chrome by weight, a copper contamination level less than 0.02 ppm copper by weight, a cobalt contamination level less than 0.02 ppm cobalt by weight, an Al contamination level less than 0.7 ppm Al by weight, a nickel contamination level less than 0.02 ppm nickel by weight, a vanadium contamination level less than 0.02 ppm vanadium by weight, and a lead contamination level less than 0.02 ppm lead by weight.